CITY OF KIRKLAND
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DEPARTMENT OF PUBLIC WORKS
PRE-APPROVED PLANS POLICY

Policy R-13: INTERSECTION SIGHT DISTANCE

Sight Distance at Intersections

1. General – These guidelines establish the sight distance triangle that must be kept clear of sight obstructions for all intersections and driveways pertaining to new developments. They are also applicable to the investigation of sight-distance complaints at existing intersections and driveways. The sight distance triangle depends primarily on the required visibility for drivers and pedestrians at intersections and driveways. It is determined by the type of intersection control (stop or yield sign, traffic signal or no control) and the speed limit on the major road or street entered upon. In the following sub-sections, the sight distance requirements used to properly establish sight distances triangles at various types of intersections and driveways are presented. Table 2 on page 2 lists recommended (desirable) and minimum (required) sight distances values and Figures 1, 2, 3a, 3b and 4 on pages 5 through 8 show corresponding sight distance triangles.

2. Types of Intersections and Driveways. – Table 1 below summarizes the characteristics of various types of intersections and driveways.

TABLE 1: Types of Intersections and Driveways. Use this table to determine type (A through G)

Intersections		
Type	Control Type	Speed Limit (MPH) on Major Street or Street Entered Upon
A	No Control	25
B	Stop Control on Minor Street	Any
C1	Yield – Crossing Maneuver from Yield Controlled Approach	25
C2	Yield – Turning Maneuver from Yield Controlled Approach	25
D	Signal	Any
E	All Way Stop	Any
G	Cases not covered by Types A through E	
Driveways		
Type	Driveway PM Peak Volume	Major Street Average Daily Traffic
F1	<10	< 6000
F2	10 ≥ and < 50	Any
F3	50 ≥ and ≤200	Any
F4	> 200	Any
G	Cases not covered by Types F1 through F4	

3. How to Establish Sight Distance Triangles– Sight distance triangles for various types of intersections and driveways are shown in **Figures 1, 2, 3a and 3b** on pages 5 through 7. In these figures, the sight distance triangles are represented by the shaded areas. Point A, or driver's decision point, represents the location of the driver; Point B is located on the major road at a specific distance (to the right and to the left) from the driver. This distance, referred to as the required sight distance, represents how far (on the major road) the driver should be able to see so as to safely exit a minor road or driveway or to make a right turn on red at a signalized intersection. In Figure 4 on page 8 the driver/pedestrian sight distance triangle also referred to as "pedestrian/driver inter-visibility area" is represented by the shaded area. This is the area that must be kept free of obstructions thus drivers exiting a driveway can see approaching pedestrians on the sidewalk and vice versa. Figure 4 does not apply to entrance to buildings and/or parking lots located inside buildings. **Table 2** on page 2 shows (in the right most columns) the sight distances values that need to be used to determine the sight distance triangle at various types of intersections and driveways.

   For **uncontrolled intersections** (no traffic light, stop sign or yield sign described in **Type A/Figure 1)** or a **yield-controlled intersection** described in **Type C/Figure 3a**, contact **Iris Cabrera**, City Transportation Engineer, at **425-587-3866** to have the Public Works Department determine the required sight distance triangle.

TABLE 2: Sight Distance Triangle Guidelines

Type of Intersection or Driveways	Distance from Edge of Traveled Way (ft)	Major Street (Street Entered Upon)		
		Speed Limit (MPH)	Sight Distance Value (ft) (a) (B-C1) and (B-C2)	
			Recommended (Desirable)	Minimum (Required) (d)
A – Uncontrolled (See Figure 1)	115 (b)	25	115	115
B - Stop Control on Minor Street (See Figure 2)	14.5	25	280	150
		30	335	200
		35	390	250
C - Yield Sign On Minor Street				
C-1: Yield Control – Crossing Maneuver (See Figure 3.a)	130 (c)	25	240	240
		30	290	290
		35	335	335
C-2: Yield Control – Turning Maneuver (See Figure 3.b)	82 (c)	25	295	295
		30	355	355
		35	415	415
D – Signalized Intersection (See Figure 2)	14.5	25	240	150
		30	290	200
		35	335	250

F1 – F4 Driveways (See Figure 2)					
Type	Distance from Edge of Traveled Way (ft)	Average Daily Traffic	Speed Limit (MPH)	Recommended (Desirable)	Minimum (Required) (d)
F1 (<10 Peak Hour Trips)	10	<6000	25	150	155
			30	200	200
F2 (10-49 Peak Hour Trips)	14.5	<6000	25	150	155
			30	200	200
			35	250	250
		>6000	25	280	155
			30	335	200
			35	390	250
F3 (50-200 Peak Hour Trips)	14.5	<6000	25	150	155
			30	200	200
	14.5	>6000	25	280	155
			30	335	200
			35	390	250
F4 (>200 Peak Hour Trips)	14.5	<6000	25	280	155
			30	335	200
	14.5	>6000	25	280	155
			30	335	200
			35	390	250
F1-F4 (See Figure 4)	80 (e)	NA	NA	22 (f)	NA

Footnotes:
(a) These values should be adjusted for grades with slopes of a magnitude of grade greater than 3%, number of lanes greater than two, for skewed intersections or for design vehicles other than passenger cars, using the intersection sight distance procedures in Chapter 9 of a Policy on Geometric Design, AASHTO, 7th Edition
(b) Distance back from center of intersection.
(c) Distance back from point C2 for types C-1 and C-2 intersections.
(d) Minimum (Required) only permitted if Recommended (Desired) is not possible (see page 3 for further explanation).
(e) Distance from back of the sidewalk.
(f) Distance parallel to the sidewalk from the center of the driveway.

a. The values in **Table 2** on page 2, referred to as **Recommended (Desirable)** sight distance are based on the intersection sight distance procedures in Chapter 9 of A policy on Geometric Design, AASHTO, 7th Edition.

b. The values on **Table 2 on** page 2, referred to as **Minimum (Required)** sight distance are based on the stopping sight distance values in Chapter 3 of A policy on Geometric Design, AASHTO, 7th Edition.

c. The **Recommended** values are required. If the **Recommended** values cannot be reasonably obtained due to the presence of fixed structures that cannot be removed or roadway features such as horizontal and vertical curves then the driveway shall be relocated or designed to maximize sight distance, but in no way can the sight distance be less than the **Minimum** value. The **Minimum** values may be permitted, on a case-by-case basis, on streets that allow angle parking and have 25 MPH speed limit and at existing public street intersections that is not a high accident location (excluding driveways and private streets) unless the public street intersection will be redesigned.

d. To determine the **Average Daily Traffic for Driveways F1 through F4**, see the City's web site at www.kirklandwa.gov go to City Departments, Public Works, Transportation, Data and Resources..

e. To determine the **number of Peak Hour Trips for Driveways F1 through f4**, contact Iris Cabrera, City Transportation Engineer, at (425) 587-3866 to have the Public Works Department estimate the number of PM peak hour trips.

4. Permissible Intrusion in the Area To Be Kept Clear of Sight Obstruction

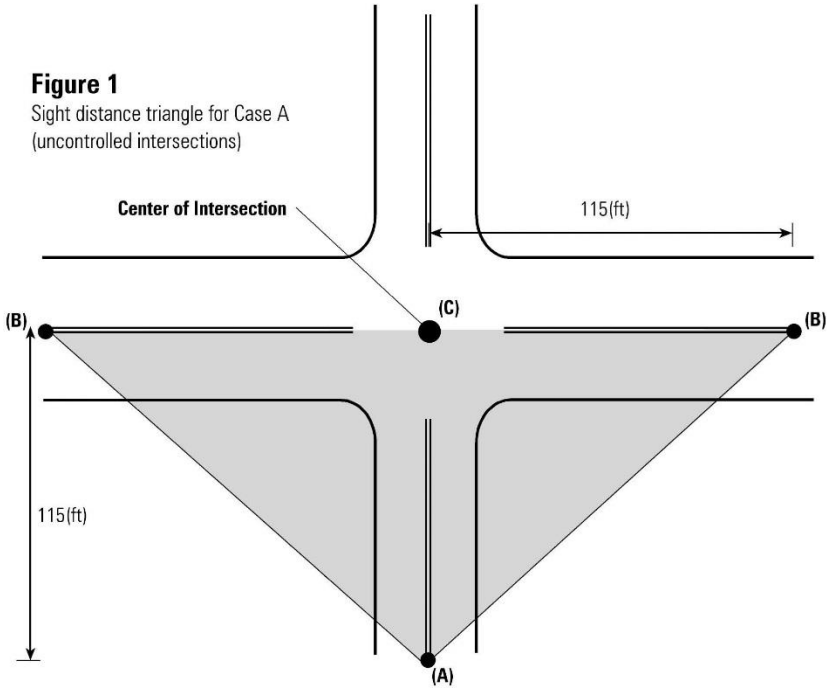
a. General – Except as stated in subsection (4)(b) of this section or unless specifically approved by the Public Works Director, no structure, improvement, vegetation or other objects may be within the area to be kept clear of sight obstructions between three (3) feet and eight (8) feet above the elevations of the pavement edge of each intersecting street, private driveway, or vehicular access easement or tract where that street, driveway or vehicular access easement or tract meets the points of the triangle that form this area furthest away from the intersection.

b. Exceptions – The following are permitted to be within the area that must be clear of sight obstructions:
Natural and fabricated objects and natural topography of the ground if the Public Works Director determines that adequate visual access is available. However, to fulfill the intent of this section, the Public Works Director may require land surface modification as part of any development activity on the subject property.

Type A – Uncontrolled Intersections

Uncontrolled intersections are not controlled by either stop or yield signs. They are usually located on streets that carry very low volumes and have a 25 MPH speed limit. Figure 1 below shows the sight distance triangle for this type of intersection. In this Figure, Point A and point B are each located on the center of the intersecting street approaches, 115 ft from Point C, which is located at the center of the intersection.

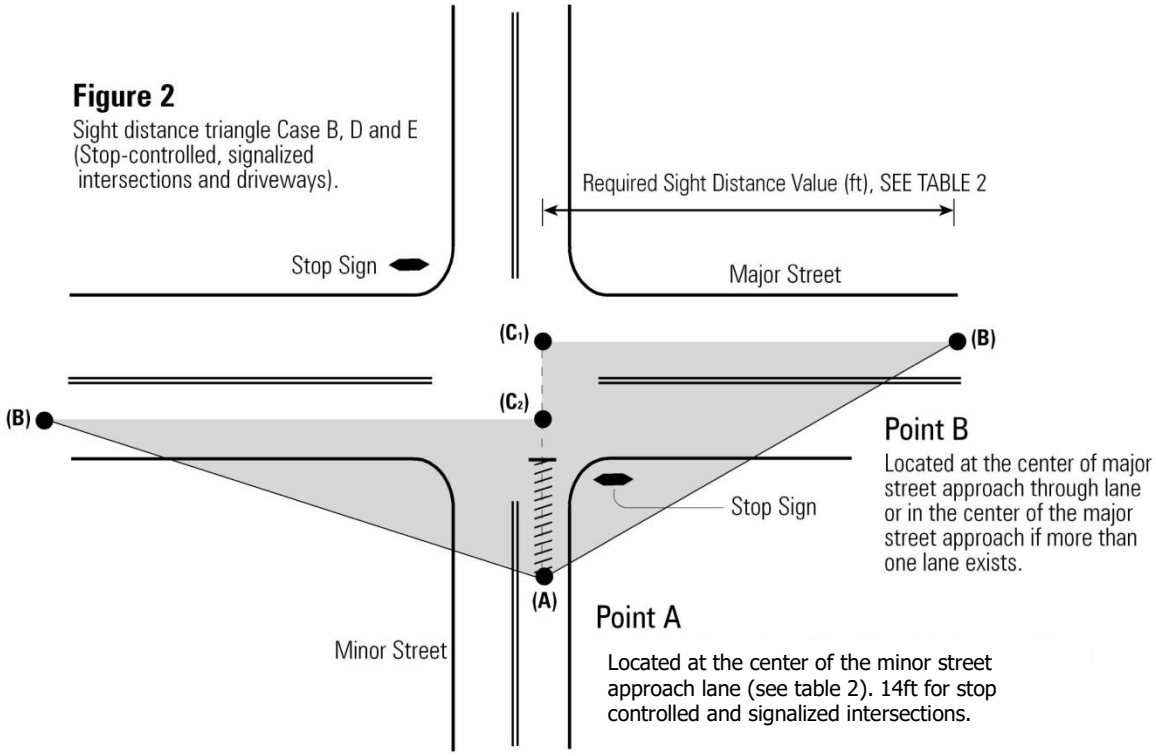
The sight distance triangle area that must be kept free of sight obstructions is the shaded area limited by segments AC, BC and AB.



Type B – Stop Controlled Intersections

Type B intersections are those at which the minor street approaches are controlled by stop signs. Sight distance triangle to the left is the shaded area bounded by segments A-B, B-C2 and A-C2; whereas sight distance triangle to the right is the shaded area bounded by the A-B, B-C1 and A-C1 segments as shown in Figure 2 below. Point A, or decision point, is located in the center of the minor street approach lane, 14.5 ft. from the edge of the major road's traveled way**. The traveled way is the portion of the road intended for the movement of vehicles and bicycles, exclusive of shoulders and turning lanes.** Point B is located on the center of the through lane on the major street (or in the center of the major street approach if more than one lane exists), a specific distance left and right from Points C1 and C2. The distance C1-B (same as C2 –B) is the required sight distance, which can be found in Table 2 on page 2.

Although it is not typical to do so, if a parking lane exists on the major street, it may be excluded from the traveled way in special cases. Usually these are cases where volumes and speeds are low and therefore the overall safety risk at the intersection is considered low.



Type C – Yield Controlled Intersections

Yield control at intersections shall only be applied to a local street whose speed limit is 25 MPH or less. Two situations need to be considered for yield-controlled intersections: making a crossing maneuver from the yield-controlled approached and making a turning maneuver from the yield-controlled approach**.** The sight distance triangles for each of these situations are shown in Figures 3a and 3b on page 7 respectively for Types C-1, crossing maneuver for a yield-controlled approach and C-2, turning maneuver from a yield-controlled approach.

Figure 3a and Figure 3b show the approach sight distance triangles for these two maneuvers. Within the approaching sight distance triangle Point A is located in the center of the minor street approach lane, 130 ft from Point C2 for crossing maneuvers and 82 feet for turning maneuvers. Point C2 is located at the center of the nearest major street approach lane. In both figures, points C1 and C2 are separated by a distance equal to the width of one through lane on the major street.

The departure sight distance triangles similar to the sight distance triangles at stop-controlled intersections (Type B above on page 2) should also be provided for yield-controlled intersections. Drivers attempting to make a turning a maneuver at a yield-controlled approach may come to a complete stop at the yield sign. However, it is not necessary to check these departure sight distance triangles since approach sight distance triangles for turning movements at yield-controlled approaches are larger than the sight distance triangles for turning movements from stop-controlled approaches.

Although it is not typical to do so, if a parking lane exists on the major street it may be excluded from the traveled way in special cases. Usually these are cases where volumes and speeds are low (25 mph) or when speed is no more than 30 mph and there is no on-street parking or bus stop within 150 feet of the intersection and it is not a high accident location, therefore the overall safety risk at the intersection is considered low.

Figure 3a
Sight Distance Triangle for Case C2 (Crossing Maneuver From Yield Controlled Approach)

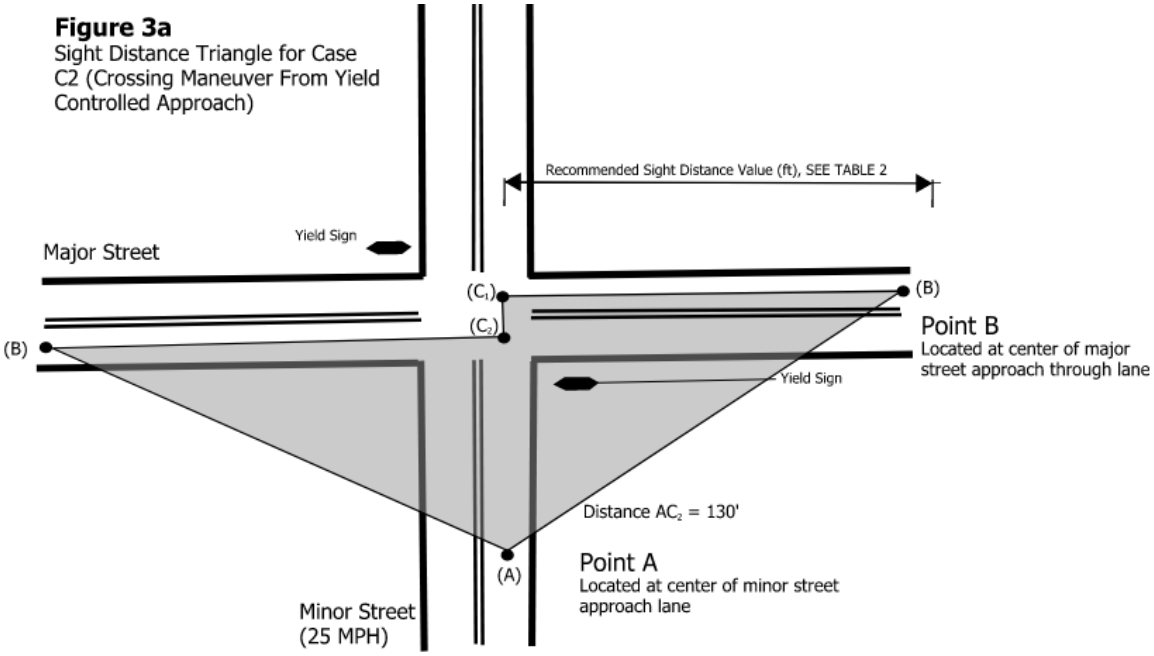
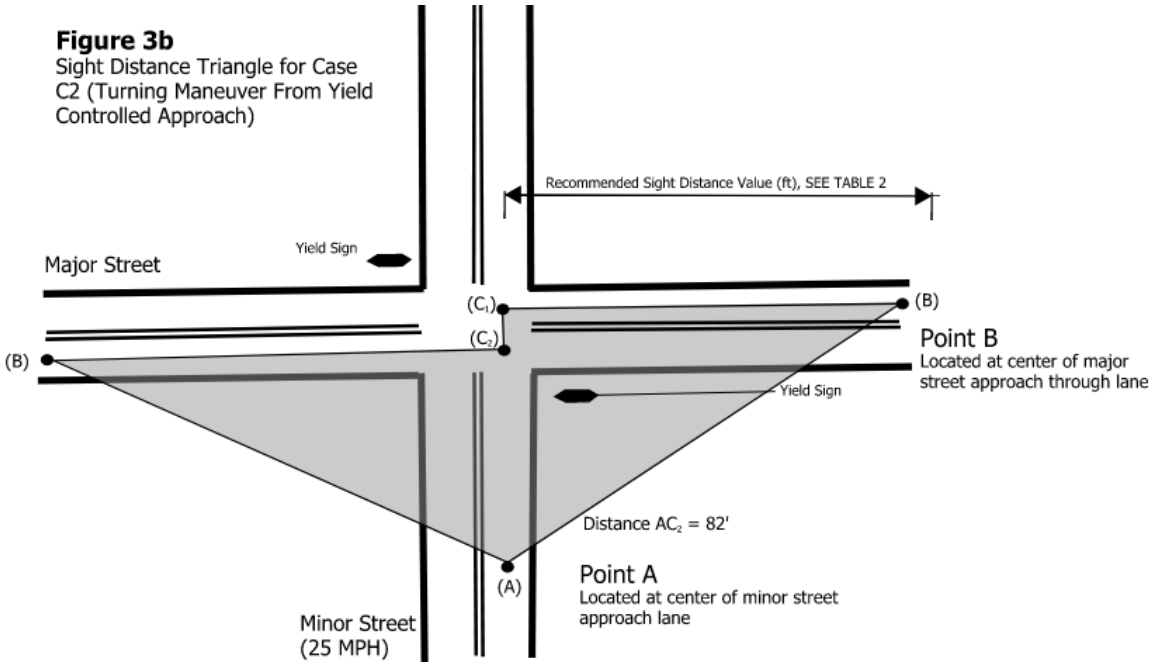


Figure 3b
Sight Distance Triangle for Case C2 (Turning Maneuver From Yield Controlled Approach)



Type D- Signalized Intersections and Signalized Driveways

At signalized intersections and signalized driveways, in order to turn right on red, drivers should be able to clearly see vehicles approaching from the left; the applicable sight distance triangle is the shaded area bounded by the A-B, B-C2, and A-C2 setback lines shown in Figure 2 on page 6. Sight distance (B-C2) values are summarized in Table 2 on page 2.

Type E – All Way Stop Controlled Intersections

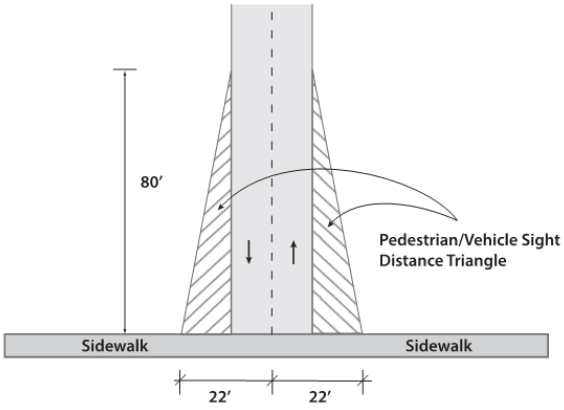
The only sight distance requirement for all-way stop controlled intersections is that the first stopped vehicle on one approach should be visible to the first stopped vehicle on all other approaches.

Type F1 through F4 – Driveways not Controlled by Traffic Signals

Driveways not controlled by traffic signals operate as Type B, Stop-Controlled Intersections; therefore, the applicable sight distance triangles are shown in Figure 2 on page 6. For driveways Type E1, Point A is located 10 ft from the edge of the major route's traveled way. For driveway Types E2 through E4, Point A is located 14 ft from the edge of the major route's traveled way. Sight distances values (B-C1, B-C2) are summarized in Table 2 on page 2.

Additionally, drivers emerging from driveways must be able to see approaching pedestrians on the sidewalk and vice versa. In Figure 4 the shaded areas on each side of the driveway show the pedestrian/vehicle sight distance triangle or pedestrian/vehicle inter-visibility area which must be kept free of obstructions per Section 4 of these guidelines. The driver's point of view is located at the center of the driveway 80 feet from the back of the sidewalk. 80 feet is the stopping sight distance for a vehicle traveling at 10 MPH. The required sight distance is measured parallel to the sidewalk 22 feet from the center of the driveway. This distance is based on the driver's effective field of vision.

Figure 4
Pedestrian/Vehicle Sight Distance Triangle at Driveways



Type G- Intersections and Driveways not Covered in Types A-F.

The sight distance triangle for intersections and driveways that do not fit any of the types previously described are to be analyzed on a case by case basis.